# Foreword

## How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

An error is associated with each forecast, and this error decreases as the season progresses and more data becomes available. To express the range of error that can be expected, "most probable" forecasts are issued along with a range representing a "reasonable minimum" and a "reasonable maximum". Actual streamflow can be expected to fall within this range in eight out of ten years. Additionally two specific scenarios are provided based on the assumption that subsequent precipitation will be "wet", above average, or "dry", below average.

## For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

| STATE | ADDRESS |
|---|---|
| Alaska | 201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687 |
| Arizona | 201 East Indianola Ave., Suite 200, Phoenix, AZ 85012 |
| Colorado | 2490 West 26th Ave., Building A, 3rd floor, Denver, CO 80211 |
| Idaho | 3244 Elder Street, Room 124, Boise, ID 83705 |
| Montana | 10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715 |
| Nevada | 1201 Terminal Way, Room 219, Reno, NV 89502 |
| New Mexico | 517 Gold Ave. S.W., Room 3301, Albuquerque, NM 87102-3157 |
| Oregon | 1220 Southwest 3rd Ave., Room 1640, Portland, OR 97204 |
| Utah | 4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147 |
| Washington | W. 920 Riverside, Room 360, Spokane, WA 99201-1080 |
| Wyoming | Federal Building, 100 "B" Street, Room 3124, Casper, WY 82601 |

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209-3489.

Water supply reports published by other agencies:

California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

# Utah
# Water Supply Outlook

and

## Federal – State – Private
## Cooperative Snow Surveys

**Issued by**

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**In cooperation with**

Utah State Department of Natural Resources

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| State Engineer | Director |
| Division of Water Rights | Division of Water Resources |

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# GENERAL OUTLOOK

## SUMMARY

The undesirable water supply outlook of one month ago has deteriorated further following another month of below average rainfall in most areas. Streamflow forecasts have slipped another 5 to 30% and shortages are already occurring in some areas.

## SNOWPACK

Snowpack on the watersheds of Utah as of June first is estimated at only 6% of average. Only a handful of the snow courses across the State still have snow. All snow courses in the watersheds draining into the Jordan River and Tooele Valley areas are bare as well as those in southeastern Utah and southwestern Utah. The Bear River snowpack is estimated at 7% of average, the Weber 5%, 6% on the Sevier, and the Uinta Mountains 12%. June first snowpack this year is generally slightly greater than last year in the northern mountains but much less than last year in southern Utah.

## PRECIPITATION

May precipitation was the second consecutive month of below normal precipitation at mountain stations in all areas of the State. Some areas of Utah have had as many as six consecutive months of below normal precipitation and only one month this water year which recorded above normal rainfall. The Bear River basin received the most abundant rainfall with 87% of normal and the Sevier received the least with only 54% of average for the month. May rainfall at valley stations was extremely erratic with some stations receiving heavy thunderstorms which boosted monthly totals to well above normal. The majority of sites received only 50 to 80% of average rainfall in May.

Water year accumulation of precipitation at mountain stations has now fallen to below average levels in all seven regions of the State as we have them defined. Since the beginning of the water year on October first the Bear River watershed has received ninety-eight percent of normal rainfall with totals ranging downward to 62% of normal in the mountains of southwestern Utah. Seasonal accumulation of precipitation (October through May) at valley stations is generally about 80% of normal in the northern half of the State and 50 to 80% in southern Utah.

## RESERVOIRS

Stored water reserves in 21 key irrigation reservoirs in the State are slightly below normal for the end of May at 92%. Most of the reservoirs in northern Utah are at or near capacity due to early snowmelt and should have adequate reserves to meet the needs of most users this season. Inflow to many of the reservoirs in the State in May was extremely low as a result of the early loss of snowpack experienced this season. Demand on reservoir storage will intensify more than usual this season because of unusually low inflow and may leave storage at dangerously low levels at the end of this growing season in southern and eastern Utah without above average precipitation.

## STREAMFLOW

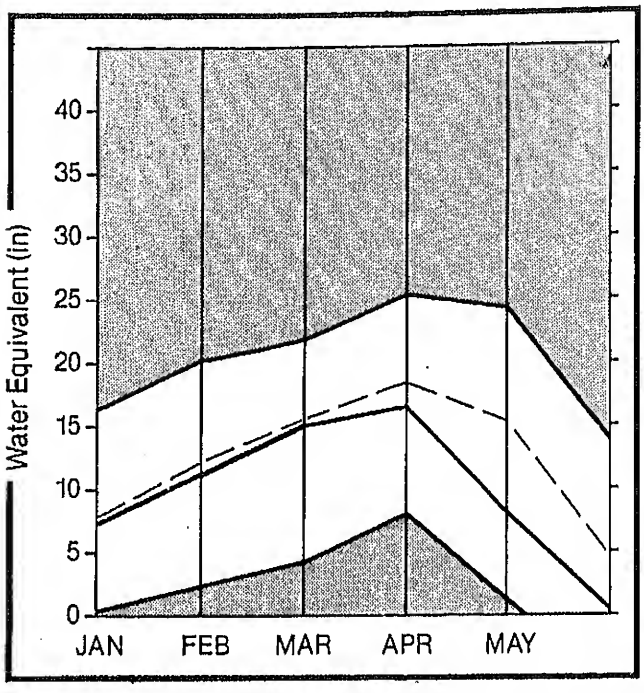
Projections of spring and summer streamflow have suffered another set-back as another month of below average precipitation goes into the record books. May flows are being reported which are only half of the previously recorded minimum. Total runoff for the April through July runoff period will probably be 5 to 10% lower in the North and 10 to 20% lower in the southern portion of the State than forecast last month as a result of below average precipitation in May. Shortages of irrigation water are already appearing in areas lacking adequate reservoir storage and areas relying on natural streamflow. The early runoff this year will mean that streamflows in June will more closely approximate what is normally not observed until July or August in a much drier than normal year.

## NOTICE

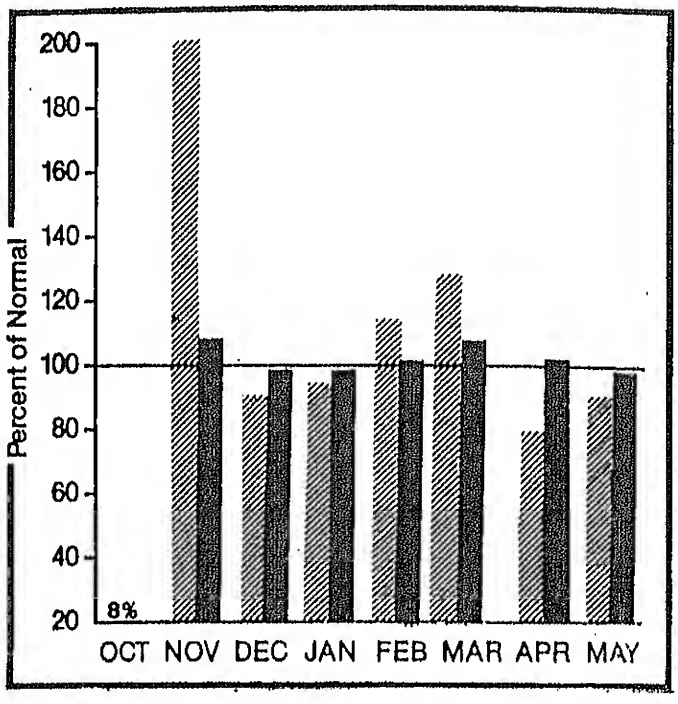
PLEASE REFER TO THE BACK OF THIS REPORT FOR WATER CONSERVATION TIPS THAT CAN HELP STRETCH WATER SUPPLIES THIS SEASON.

# Bear River Basin

**Mountain snowpack*** (inches)

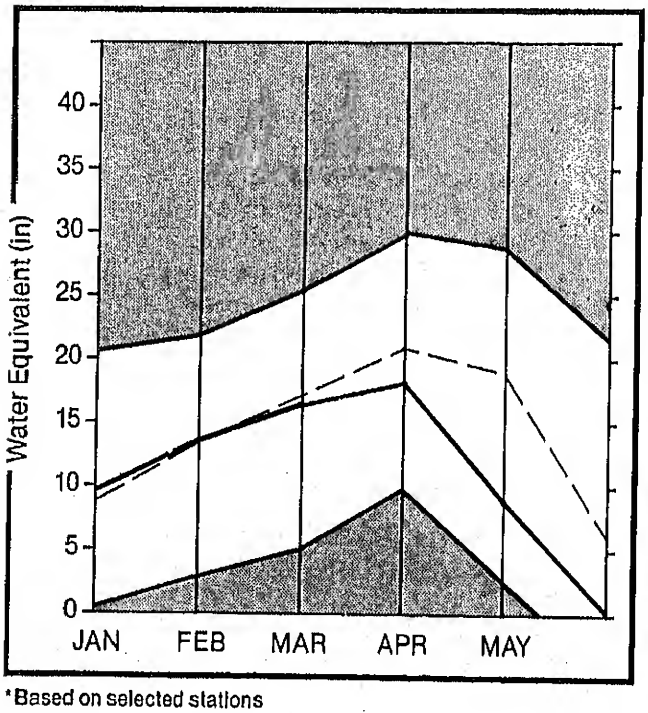



**Precipitation*** (percent of normal)




# Weber & Ogden Watersheds

**Mountain snowpack*** (Inches)




*Based on selected stations

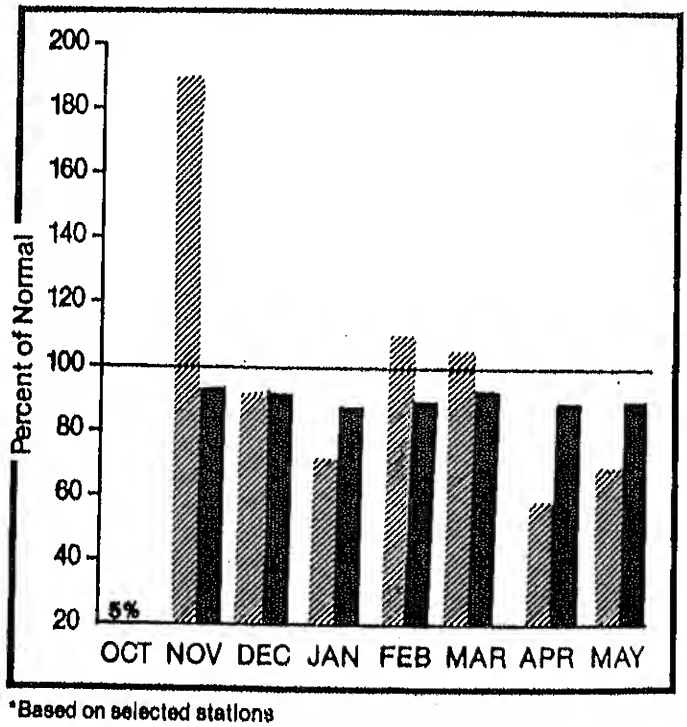
Maximum

Minimum

Average

Current

**Precipitation*** (percent of normal)



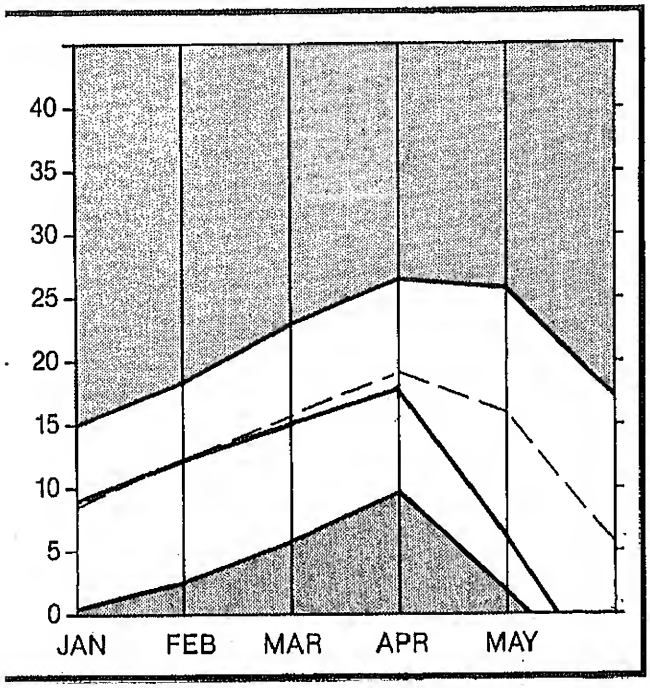

*Based on selected stations

Monthly precipitation

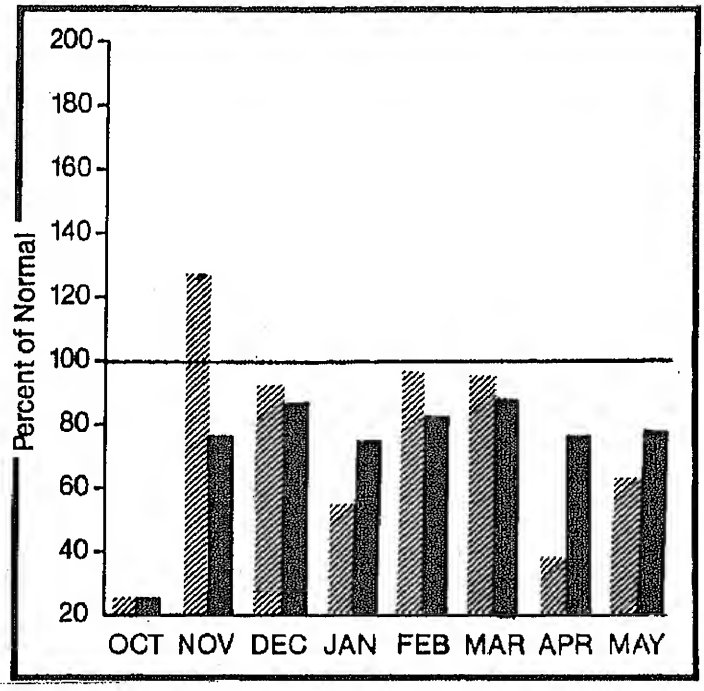
Year to date precipitation

# Utah Lake, Jordan River & Tooele Valley

ountain snowpack* (Inches)

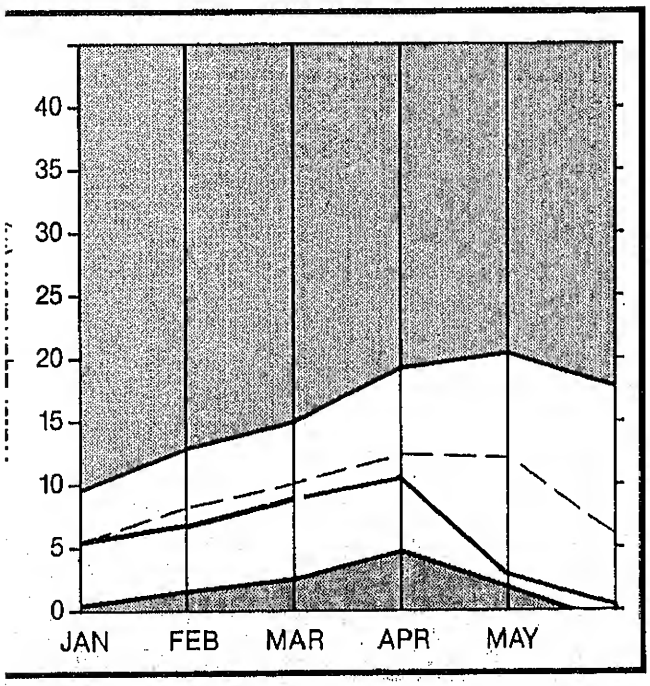



**Precipitation*** (percent of normal)

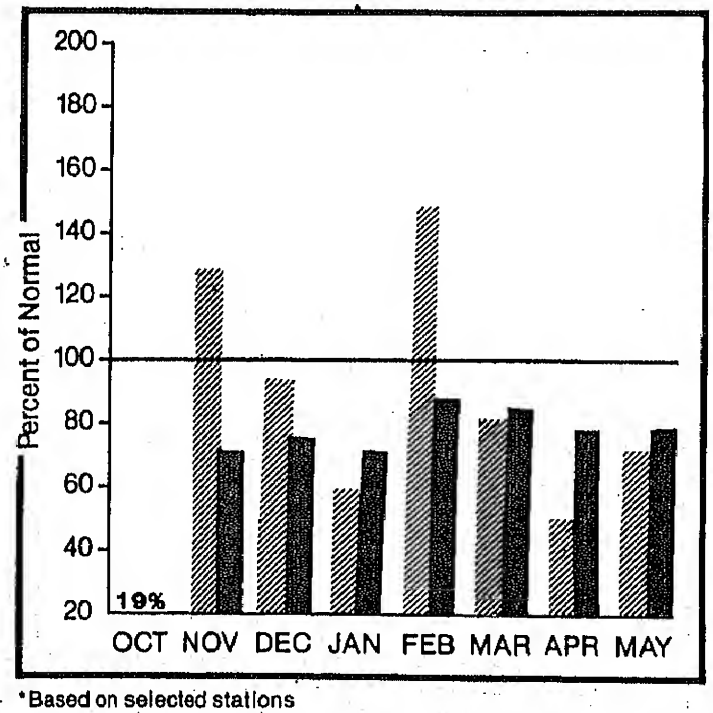



# Uintah Basin & Dagget SCD's

**lountain snowpack*** (Inches)




**Precipitation*** (percent of normal)




Based on selected stations

laximum

linimum

Average

Current

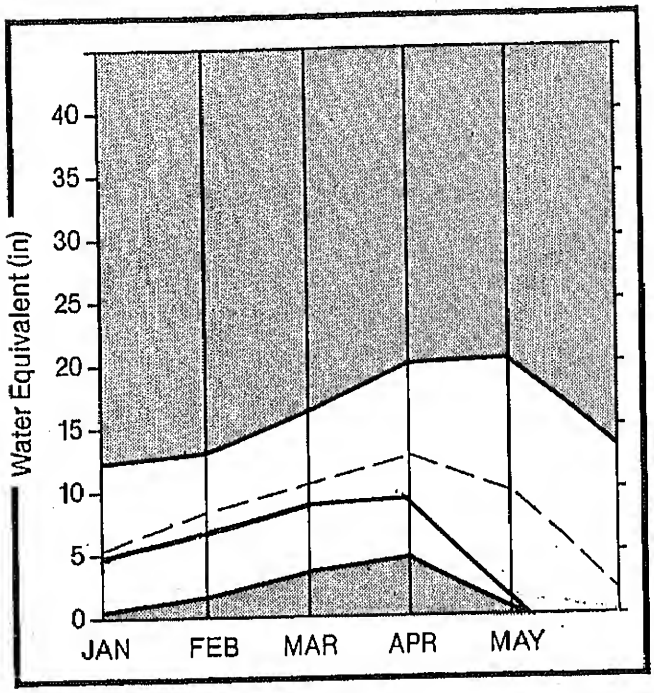
*Based on selected stations

Monthly precipitation

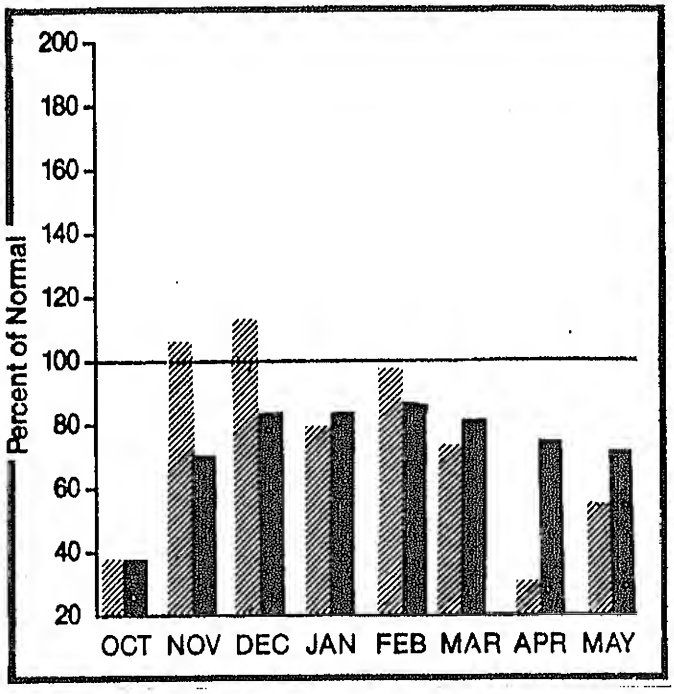
Year to date precipitation

# Carbon, Emery, Wayne, Grand, and San Juan Co.

**Mountain snowpack*** (inches)

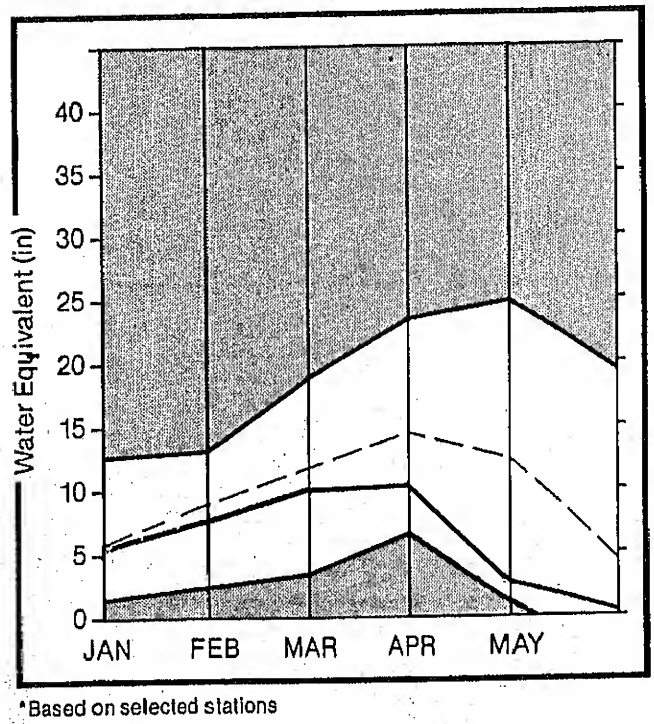



**Precipitation*** (percent of normal)

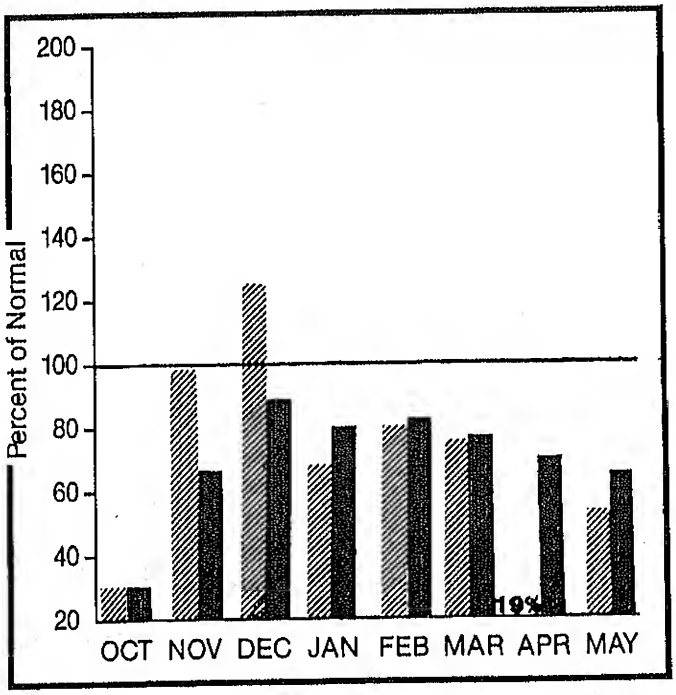



# Sevier & Beaver River Basins

**Mountain snowpack*** (inches)




**Precipitation*** (percent of normal)




*Based on selected stations

Maximum

Minimum

Average

Current

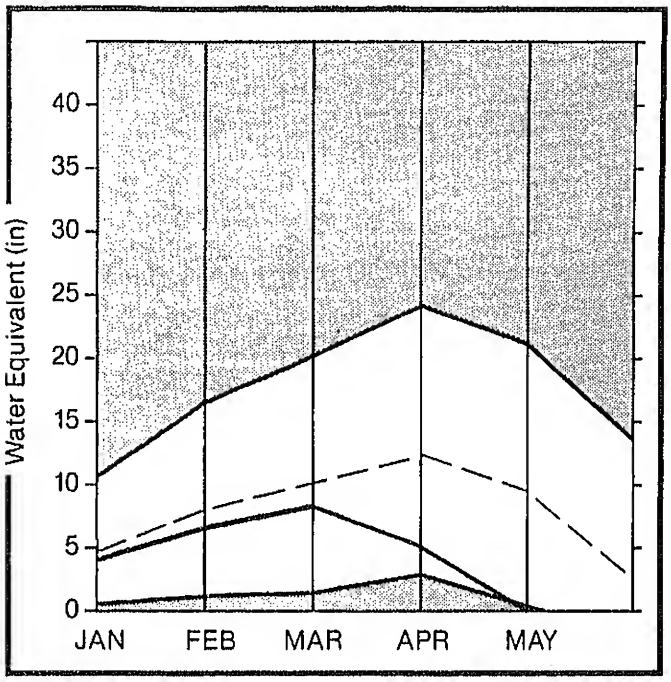
*Based on selected stations

Monthly precipitation

Year to date precipitation

# E. Garfield, Kane, Washington, & Iron Co.

**Mountain snowpack*** (inches)




*Based on selected stations

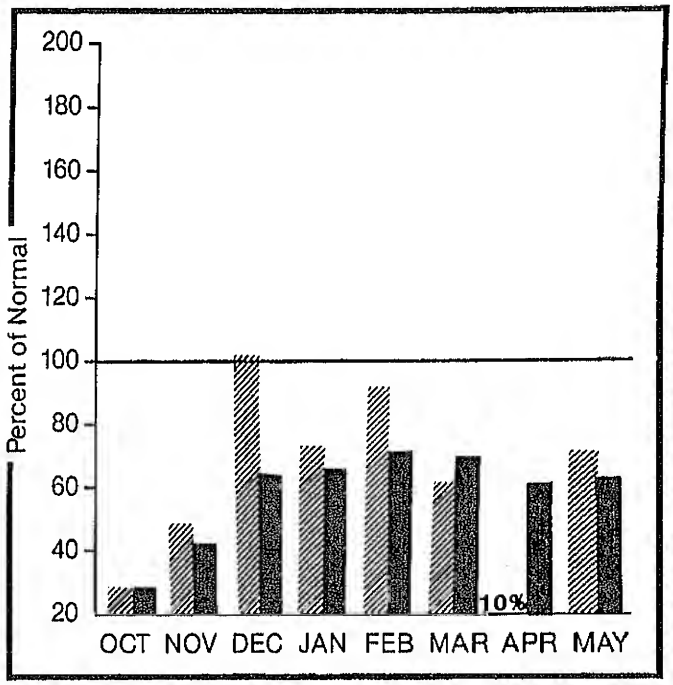
Maximum

Minimum

Average

Current

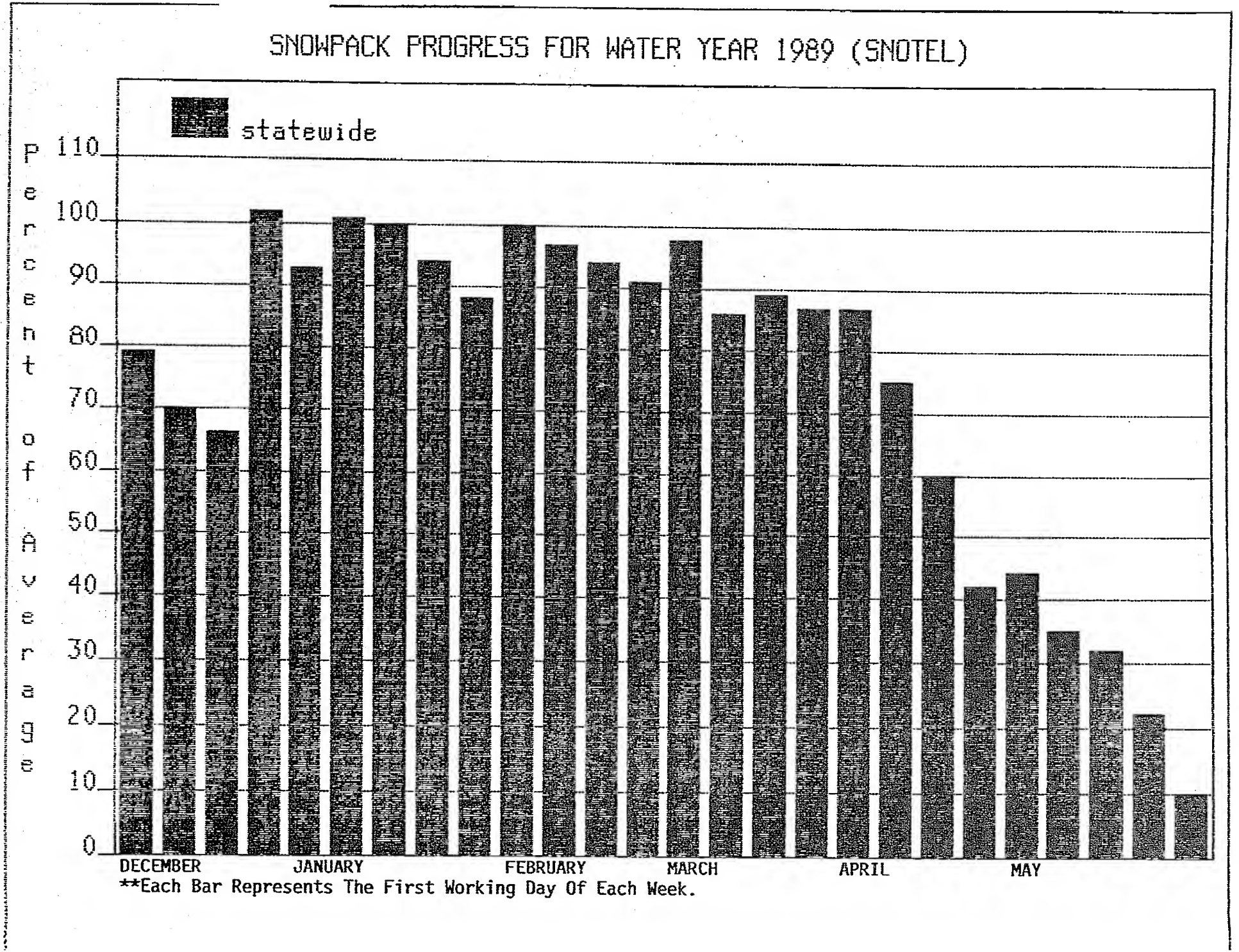
**Precipitation*** (percent of normal)



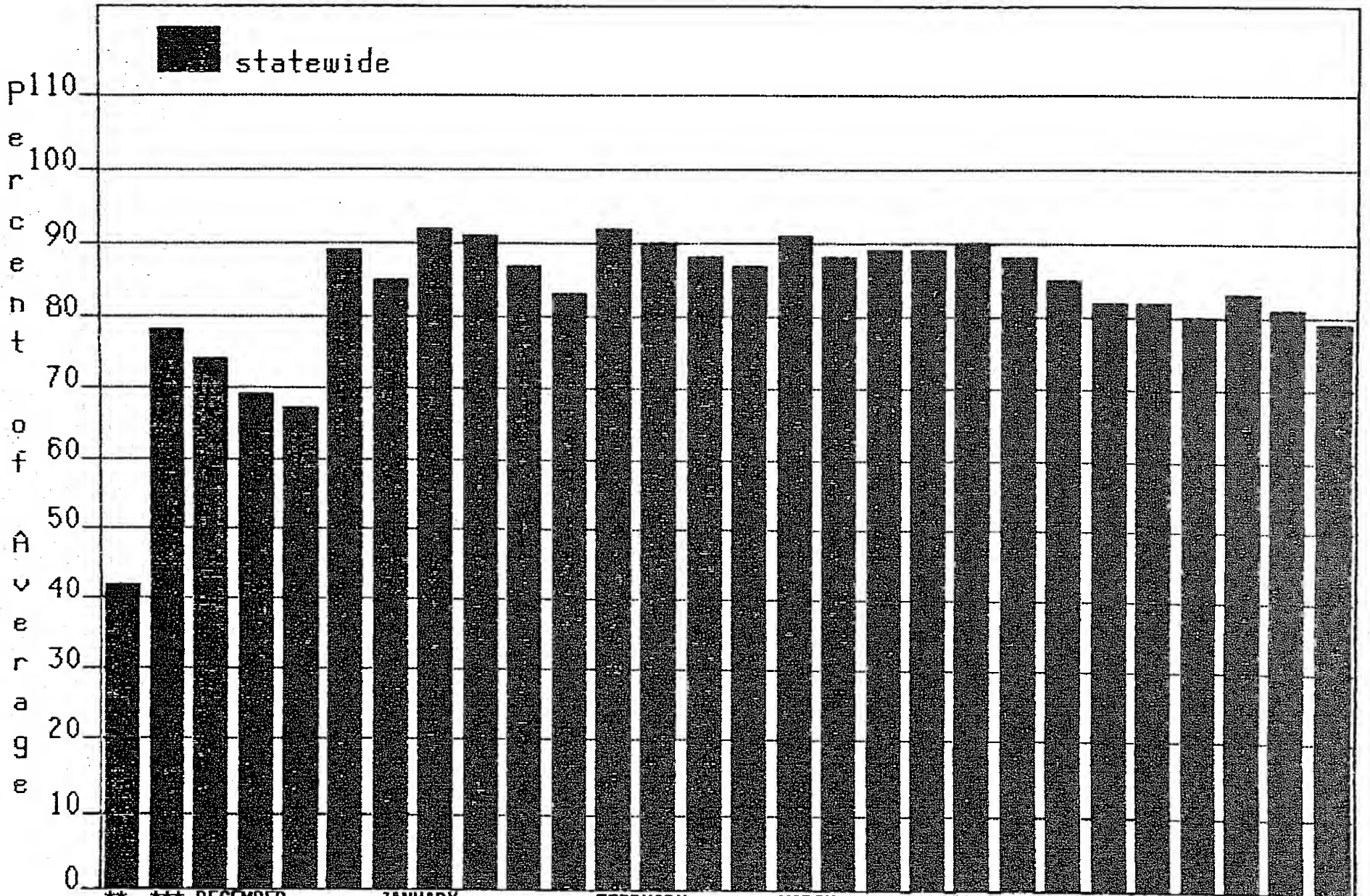

*Based on selected stations

Monthly precipitation

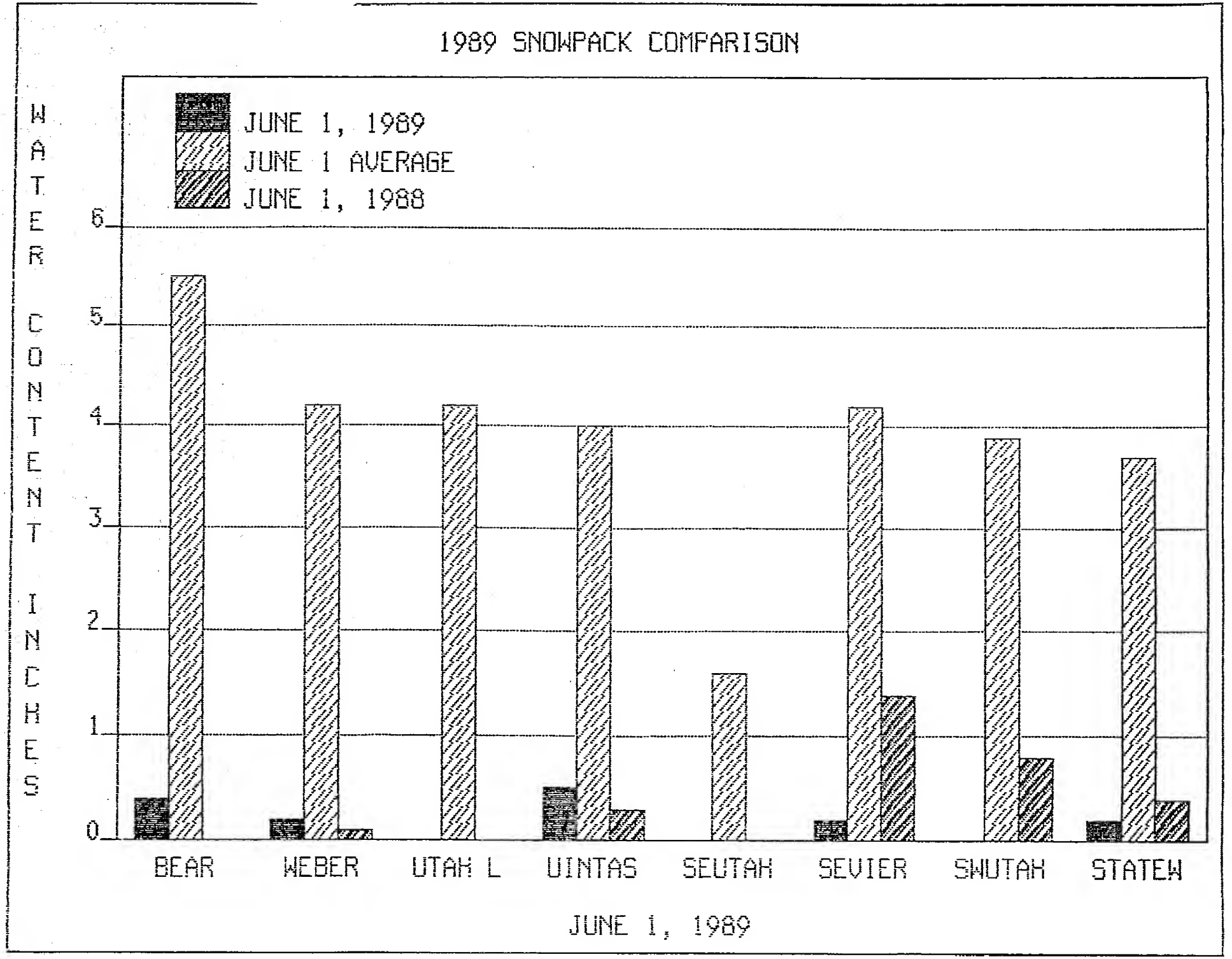
Year to date precipitation


SNOWPACK PROGRESS FOR WATER YEAR 1989 (SNOTEL)
statewide
percent of average
110
100
90
80
70
60
50
40
30
20
10
0
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
**Each Bar Represents The First Working Day Of Each Week.

# MOUNTAIN PRECIPITATION PROGRESS FOR WATER YEAR 1989 (SNOTEL)




**NOVEMBER 14th
***NOVEMBER 28th
****Each Bar Represents The First Working Day Of Each Week.


1989 SNOWPACK COMPARISON
JUNE 1, 1989
JUNE 1 AVERAGE
JUNE 1, 1988
WATER CONTENT INCHES
0
1
2
3
4
5
6
BEAR
WEBER
UTAH L
UINTAS
SEUTAH
SEVIER
SWUTAH
STATEW
JUNE 1, 1989

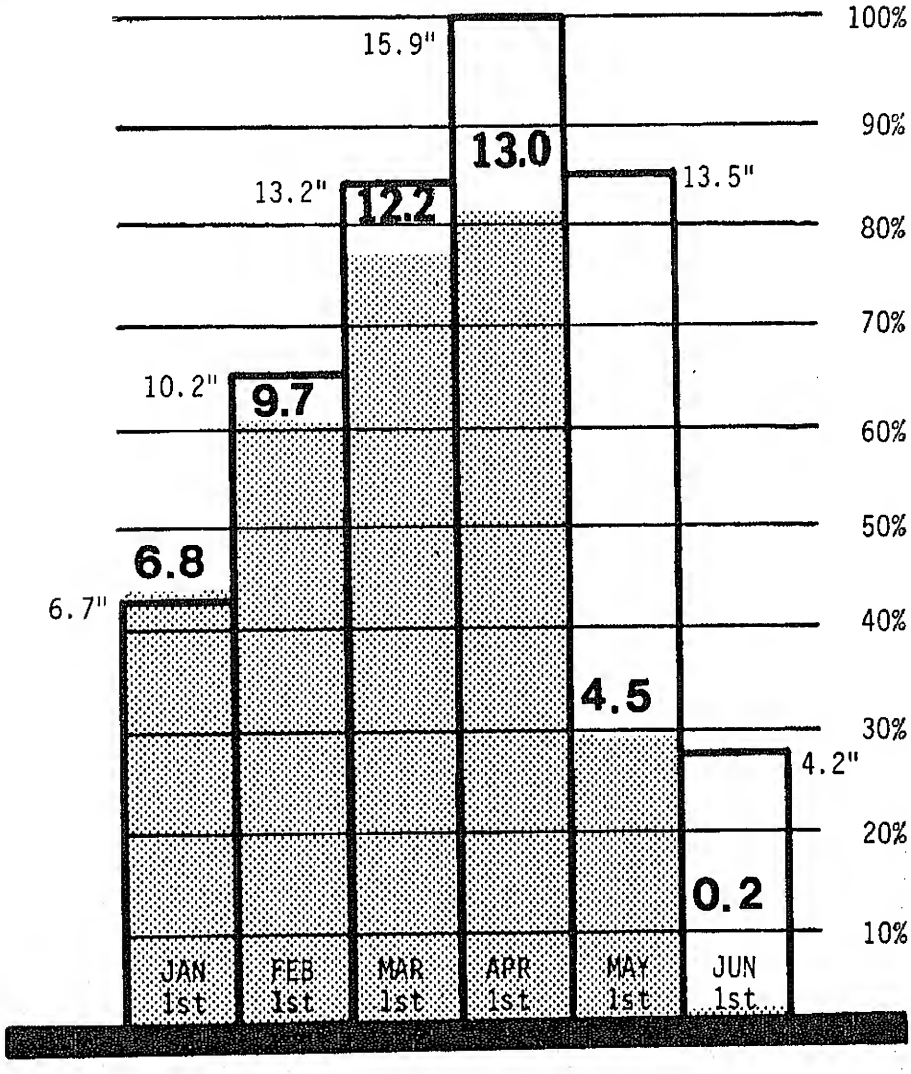
United States Department of Agriculture

**Soil Conservation Service**

Salt Lake City, Utah

# Utah Snowpack Progress

## 1989




## Statewide

N O T E :
Snow water equivalent in inches is compared to the highest seasonal amount ( 100% ). Monthly averages are accumulated by basin/state.

Averages are for the period 1961-1985.

## *OTHER PLACES FOR INFORMATION OR ASSISTANCE*

Check with local ASCS office for possible special practices or cost-sharing that might assist with major irrigation changes on your farm this year.

Maintain contact with Farmers Home Administration for special local programs or disaster loans available.

Maintain contact with the local Cooperative Extension Service office for agricultural and marketing conditions.

If you belong to an irrigation district, contact irrigation officials throughout the season to learn about current water availability and water supply forecasts.

Consult commercial irrigation equipment suppliers for system efficiency ideas.

Check with your local Soil Conservation Service office and Conservation District officials for details concerning your soil and water conservation problems.

United States
Department of
Agriculture

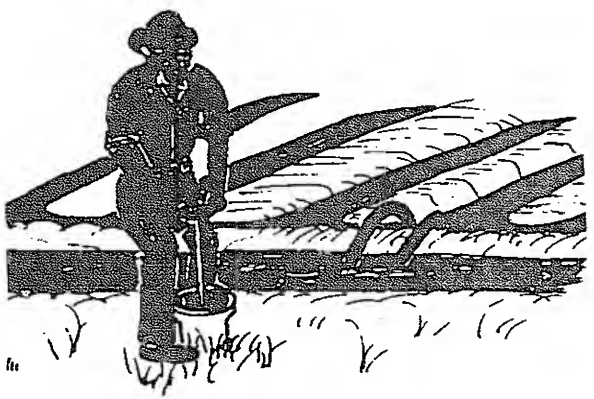
**Soil
Conservation
Service**

# WATER CONSERVATION

# TIPS

## FOR STRETCHING

## IRRIGATION WATER



# *Stretch Your Irrigation Water*

Soil can absorb irrigation water only at a given rate, which varies for each soil type. Water requirements vary for different crops. Make sure you apply water to your crop only when needed. Check soil moisture by space, probe, or soil moisture meter, and make careful visual checks of your crops.

If you have a conservation plan on your farm, or if the soil in your area has been mapped, the Soil Conservation Service can cross-check soil type and irrigation data and provide you with the water holding capacity of your soil for a given crop.

Don't know if your soil has been mapped? Check with the local SCS office. Even if the soil has not been mapped, the SCS can supply you with general information.

Water stretching measures are important to most farmers in the West. To use your available water in the most productive way possible, here's a checklist to help you analyze your irrigation system.

## *IRRIGATION SYSTEMS*

Inspect your system *before* water starts to flow.

Make sure ditches are clean and free from weeds, sediment, or other debris which can slow water velocity, affect delivery rate and increase evaporation.

Consider lining ditches with concrete or plastic. This could avoid the 10-90 percent loss which often occurs in ditches.

Make sure ditch structures — like headgates, drop structures, and pipe inlets — are strong and functional. A washed-out ditch structure could mean a lot of water lost.

Make sure ditchbanks are firm and not burrowed into by rodents. Rodent holes could cause leakage or failures.

Make sure your pump is operating at peak efficiency. Adequate maintenance will improve efficiency, guard against water loss, and avoid shutdowns.

## *SPRINKLER SYSTEMS*

Make sure nozzles aren't worn and leaky. Check pipe connections and valves to prevent leaks.

Operate sprinklers at recommended pressure. Use application rate, efficiency factor and time of application to figure how much to apply.

Consider trickle systems for orchards, vineyards, etc. Operate at recommended design values and maintain the filter system.

## *IRRIGATION MANAGEMENT*

Measure the amount of water applied to the field. This can indicate when and how much to irrigate.

Consider alternate row irrigation for crops planted in furrows. But remember to alternate the "alternate" row in later irrigations.

Consider shorter runs if you furrow irrigate. Match stream size and velocity to soil intake rate and capacity.

Consider catching and re-using tail water by pumping it back to the head of the system or re-using elsewhere.

Irrigate most crops when soil moisture reaches about 50 percent of capacity.

## *OTHER PLACES FOR INFORMATION OR ASSISTANCE*

Consult commercial nursery or garden suppliers for plant watering requirements and recommendations.

Check with your local Soil Conservation Service office, Conservation District officials, or Cooperative Extension Service office for details concerning your water conservation questions.

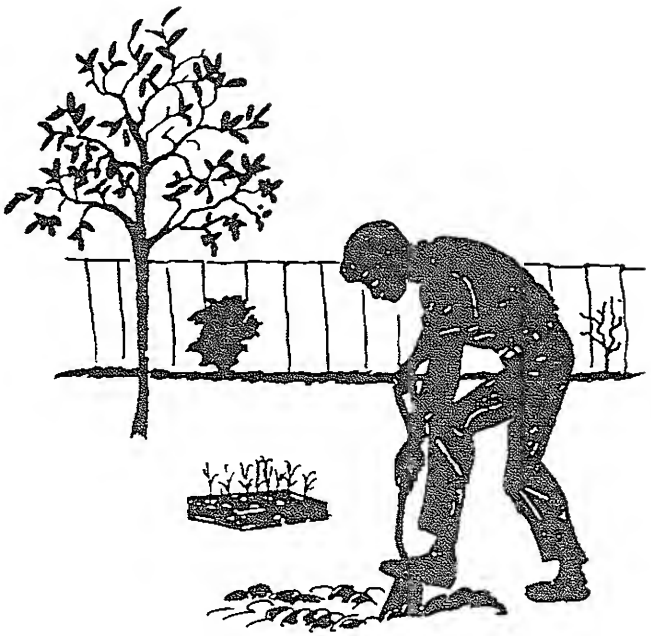
United States
Department of
Agriculture

Soil
Conservation
Service

# WATER CONSERVATION

# TIPS

## FOR STRETCHING WATER FOR YARDS AND GARDENS



# *Surviving a Water Shortage Takes Good Management*

What can be done to nurture trees, shrubs, lawns and gardens through a water-short year?

First, try to learn all you can about how much water will be available and what regulations might be put into effect.

Absorb all you can about relationships among soil, water and plants — especially your own.

Develop a plan for applying water based on supply, needs, alternatives and current conditions.

Observe and measure how your plan is working.

Those plant, water and soil relationships are crucial to success of your management plan.

Plants differ in how much water they need to survive or prosper — and this varies with climate and changing weather conditions.

Sprinklers and other devices for applying water vary in how fast they can deliver water.

And finally, soils differ in how fast they absorb moisture, how much they store and how long they retain it.

A rule of thumb says 1 inch of moisture will penetrate 12 inches deep in sandy soil; 7 inches in loam, and 4 to 5 inches in clay.

*ALTERNATIVES*

Save water for plants that can't survive without it.

Reduce watering of other plants to subsistence level. (Lawns can do without water for a long time and green up again when moisture is available.)

Don't plant annuals when water shortage is imminent.

If a vegetable garden is important, many perennials can do without water better than annuals can.

Hold up on new landscaping or consider desert or native plants.

If you were planning to remove any lawn, trees or shrubs in the future; this would be the year to do the work before you start watering.

Change your lawn and garden watering system. Try automatic, drip or different sprinkler heads for better efficiency.

*APPLY WATER EFFICIENTLY*

Water deep and less often. Shallow, frequent watering encourages shallow roots, more evaporation loss and reduces the moisture reservoir in the soil.

For best results check how long it takes to soak the entire root zone and how long this watering will last.

Don't apply water faster than soil can absorb.

Don't let water run off into street or driveway.

Water early in the day to reduce evaporation loss.

*CONSERVE MOISTURE*

Mulch around trees and shrubs and between garden rows. This holds in moisture, discourages weeds which compete for moisture.

Aerate your lawn to permit better water penetration.

Set your lawn mower blade to leave 2 or more inches of grass after mowing.

Fertilize adequately. A sick looking lawn or garden many need more fertilizer, not more water. Apply fertilizer before regular watering.

If it rains, reduce watering time accordingly. Measure how much rain has fallen, adjust watering schedule and duration accordingly.

YOU HAVE BEEN HEARD . . .

A recent evaluation of the Snow Survey and Water Supply Forecasting Program interviewed 200 users of the forecasts. We learned that:

-- Users who got their information by accessing our computer were very satisfied;

-- Users who depended on the monthly Water Supply Outlook Report needed the information much earlier in the month; and

-- The reports contained more information than many users needed.

In summary, we are producing a report that is not doing the job for most users. And we are spending a lot of money on the report.

The state-wide WATER SUPPLY OUTLOOK REPORT will be discontinued. We are proposing three actions for the next water year to better meet your needs:

FIRST, the users' direct access of forecasts by computer will be improved. We will provide better instructions and self-training materials. Also, District Conservationists who have computers will be encouraged to access forecasts and distribute local reports to those users who do not have computer facilities.

SECOND, the SCS state office will prepare individual forecast reports for the major river basins in the state. They will be the same as the reports available on the computer. Users who request it will be on a mailing list to receive one or more of the reports. They will be printed and mailed within a day or two after the basin forecast is completed and available on the computer.

THIRD, for users who are interested in the forecasts for their historical value rather than for decision-making, an annual summary will be provided. A West-Wide Report will continue to be available, published jointly with the National Weather Service.

This summer and fall will be spent developing the details of these new procedures. You will be informed prior to next water year's reports, and new mailing lists will be prepared.

Please call us or write if you have any questions.

# The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

**State**

Utah State University
Utah State Department of Natural Resources
- Division of Wildlife Resources
- Division of Water Resources
- Division of Water Rights
- Bear River Commissioner
- Price River Commissioner
- Provo River Commissioner
- Sevier River Commissioners
- Spanish Fork River Commissioner
- Utah Lake and Jordan River Commissioner

**Federal**

U.S. Department of Agriculture
- Soil Conservation Service
- Forest Service

U.S. Department of Commerce
- NOAA, National Weather Service

U.S. Department of Interior
- Bureau of Reclamation
- Geological Survey
- National Park Service

U.S. Army Corps of Engineers

**Municipality**

Manti
Salt Lake City

**Public**

Beaver River Water Users Association
Board of Canal Presidents - Jordan River
Central Utah Conservancy District
Emery Canal and Reservoir Company
Grantsville Irrigation Company
Grantsville Soil Conservation District
Moon Lake Water Users Association
Ogden River Water Users Association
Provo River Water Users Association
Strawberry Water Users Association
Sevier River Water Users Association
Weber River Water Users Association
Weber Basin Conservancy District

Other organizations and individuals furnish information for the snow survey reports. Their cooperation is gratefully acknowledged.